

Name: _____ Block: _____

Algebra Mid-Term Review

1. Evaluate: $10(4 + 3 \cdot 2) - 5^2$ 75

2. Find the value $-|x - y|$ if $x = -10$ and $y = -5$

$$-|-10 + 5| = -|-5|$$

$$= -5$$

3. A number decreased by -10 is 20. What is the number?

$$x - (-10) = 20$$

$$\begin{array}{r} x + 10 = 20 \\ -10 \quad -10 \\ \hline x = 10 \end{array}$$

Solve each equation:

4. $2x + 5 = 3x$

$$\begin{array}{r} -2x \quad -2x \\ \hline 5 = x \end{array}$$

5. $7n + 6 = 4n - 9$

$$\begin{array}{r} -4n \quad -4n \\ \hline \end{array}$$

$$\begin{array}{r} 3n + 6 = -9 \\ -6 \quad -6 \\ \hline 3n = -15 \\ \frac{3n}{3} = \frac{-15}{3} \\ \boxed{n = -5} \end{array}$$

* 6. $3(x - 1) - x = 3 + 2(x - 2)$

$$\begin{array}{l} 3x - 3 - x = 3 + 2x - 4 \\ 2x - 3 = 2x - 1 \end{array}$$

$$\begin{array}{l} 2x - 3 = 2x - 1 \\ \text{no solution} \end{array}$$

* 7. $7 + 3(x - 4) = 3x - 5$

$$7 + 3x - 12 = 3x - 5$$

$$3x - 5 = 3x - 5$$

all real numbers/identity

8. Given $f(x) = 2x^2 - 4x$, determine $f(-3)$

$$f(-3) = 2(-3)^2 - 4(-3) = 30$$

9. Solve $y = 4x - 2$ if the domain is $\{2, 3, -4\}$

$$4(2) - 2 = 6$$

$$4(3) - 2 = 10$$

$$4(-4) - 2 = -18$$

$$\{6, 10, -18\}$$

10. Using the formula $I = prt$, solve for t .

$$\frac{I = prt}{pr \quad pr} \quad \frac{I}{pr} = t$$

$$t = \frac{I}{pr}$$

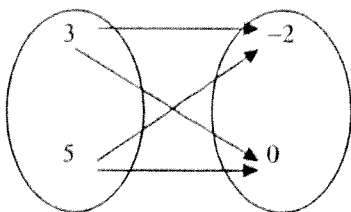
11. Which of these relations are functions?

Input	5	7	5	6
Output	6	8	19	12

no

Input	0	8	10	13
Output	5	10	15	15

yes

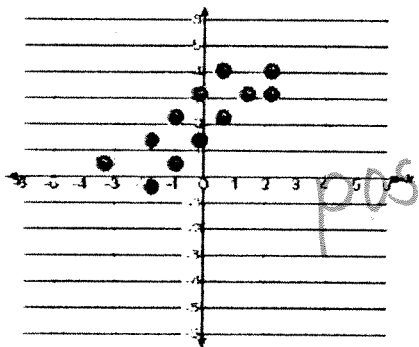
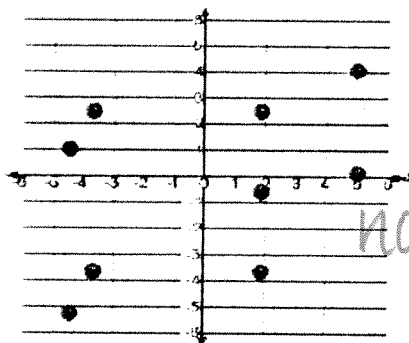
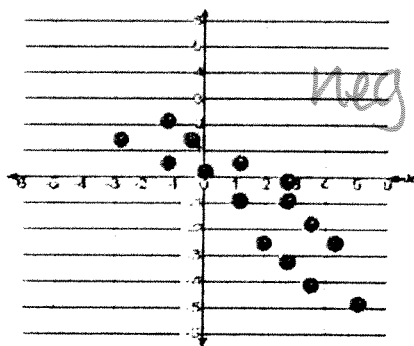


$(3, -2), (3, 0), (5, -2), (5, 0)$ no

x	y
-2	3
5	0
7	-1

yes

12. Describe the correlations for each graph.



Solve the following:

13. $2x - 8 > 12$

$$\begin{array}{r} 2x - 8 > 12 \\ + 8 \quad + 8 \\ \hline 2x > 20 \\ \hline x > 10 \end{array}$$

$$\{x | x > 10\}$$

14. $4x - 5 \leq 2x + 11$

$$\begin{array}{r} -2x \quad -2x \\ 4x - 5 \leq 2x + 11 \\ \hline 2x - 5 \leq 11 \\ + 5 \quad + 5 \\ \hline 2x \leq 16 \end{array}$$

$$\frac{2x}{2} \leq \frac{16}{2}$$

$$x \leq 8$$

$$\{x | x \leq 8\}$$

15. Is $(2, -1)$ a solution of $2x - 3y < 5$?

$$2 \cdot 2 - 3 \cdot (-1) < 5$$

$$4 + 3 < 5$$

$$7 < 5 \quad \text{NO}$$

Name the property:

16. $7 \cdot (6 \cdot 2) = (7 \cdot 6) \cdot 2$

Associative Property of Multiplication

17. $5(xy + 4) = 5xy + 20$

Distributive Property

18. $8 \cdot 9y = 9y \cdot 8$

Commutative Property of Multiplication

19. $3(1) = 3$

Identity Property of Multiplication

20. Solve and graph $x + 1 > -2$

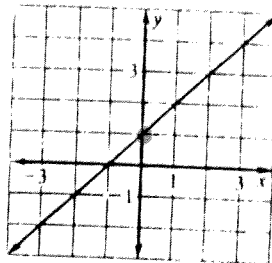
$$\begin{array}{r} -1 \quad -1 \\ x + 1 > -2 \\ \hline x > -3 \end{array}$$



21. Use the distributive property to simplify $3(y - 8)$

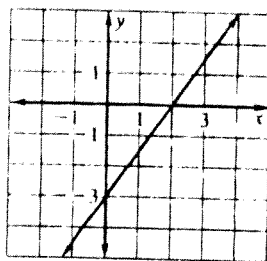
$$3y - 24$$

22. What is the y-intercept?

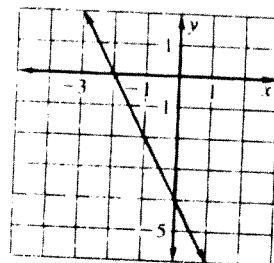


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23. Write the equation of the graphs below:



$$y = \frac{3}{2}x - 3$$



$$y = -2x - 4$$

24. What are the x and y intercepts for $3x - 4y = 12$?

$$(4, 0), (0, -3)$$

25. Find the slope passing through the points $(-4, -2)$ and $(5, 1)$.

$$m = \frac{3}{9} = \frac{1}{3}$$

26. Name the constant of variation. $y = -4x$

$$K = 4$$

27. The variables x and y vary directly. Write an equation that relates x and y when $x = 5$ and $y = 15$.

$$y = Kx \quad 15 = K5$$

$$K = 3$$

$$y = 3x$$

28. What is the slope of $y = -4x + 3$?

$$m = -4$$

29. Write an equation of the line whose slope is 4 and whose y-intercept is 5.

$$y = 4x + 5$$

30. Find the equation of the line parallel to the graph of $12x - 3y = 10$ and containing the point $(-5, 3)$.

$$\begin{aligned} 12x - 3y &= 10 \\ -12x & \quad -3y &= -12x + 10 \\ -3y &= -12x + 10 \\ y &= 4x - \frac{10}{3} \end{aligned}$$

$$\begin{aligned} m &= 4 \quad (-5, 3) \\ y &= mx + b \\ 3 &= 4(-5) + b \\ 3 &= -20 + b \\ +20 & \quad +20 \\ 23 &= b \\ y &= 4x + 23 \end{aligned}$$

31. If line m has a slope of $-\frac{3}{4}$, then what is the slope of a line perpendicular to m ?

$$\frac{4}{3}$$

32. Find the equation of the line through $(-4, 5)$ with an undefined slope.

$$x = -4$$

33. What is the equation of the line whose graph passes through the origin and has a slope of 5?

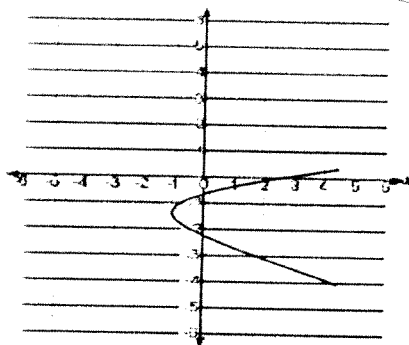
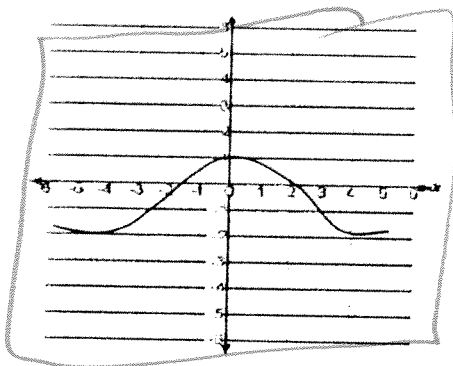
$$y = mx + b \quad (0, 0)$$

$$\begin{aligned} m &= 5 \\ 0 &= 0(5) + b \end{aligned}$$

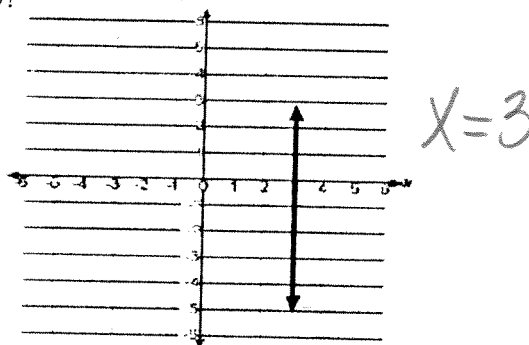
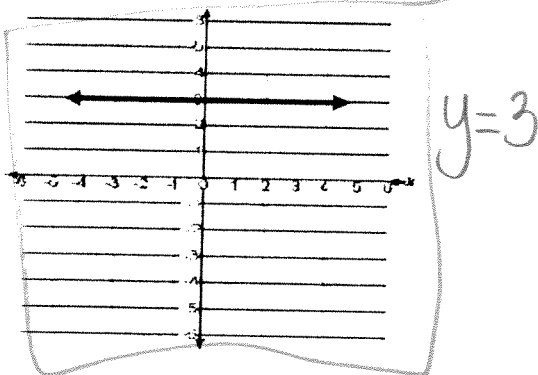
$$0 = b$$

$$y = 5x$$

34. Which is the graph of a function?



35. What is the equation of each line shown below?



36. Find the equation of the line passing through these points: (3, -7) and (6, -1).

$$m = \frac{-1+7}{6-3} = \frac{6}{3} = 2$$

- (a) In Point-Slope Form:

$$y + 7 = 2(x - 3)$$

$$y + 1 = 2(x - 6)$$

- (b) In Slope-Intercept Form:

$$y = mx + b$$

$$-7 = 2(3) + b$$

$$-7 = 6 + b$$

$$\frac{-6}{-6} = \frac{-6}{-6}$$

$$y = 2x - 13$$

37. Given the following points, determine the "Best Line of Fit" equation.

x	y
26.8	45.2
25.1	47.7
23.4	48.9

STAT Menu

- a. $y = -1.09x + 74.58$
 b. $y = -0.89x + 71.53$
 c. $y = 0.89x + 105.52$
 d. $y = 1.09x - 74.58$

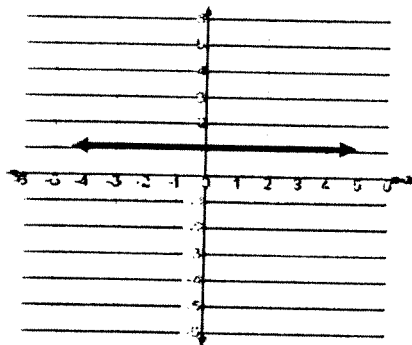
38. What is the x-intercept of the graph of the function shown below?

$$2x + 6y = 18$$

- a. 2
 b. 3

- c. 6
 d. 9

39. Determine the rate of change of the line parallel to the line in the graph.



0

40. Write an equation to represent the pattern shown in the table.

x	-8	-5	-2	1	4
y	11	5	-1	-7	-13

$$y = -2x - 5$$

41. Kaitlin solved $x - 11 \geq 2y - 6$ for y using the following steps.

$$x - 11 \geq 2y - 6$$

$$\begin{array}{r} x - 11 \geq 2y - 6 \\ -2y \quad -2y \\ \hline \end{array}$$

$$\text{Step 1: } -2y - x - 11 \geq -6$$

$$\text{Step 2: } -2y \geq x + 5$$

$$\text{Step 3: } y \leq -0.5x - 2.5$$

Which property justifies Step 1?

- a. Commutative Property of Addition
- b. Distributive Property
- c. Subtraction Property of Inequality
- d. Multiplication Property of Inequality

42. The cost of a school banquet is \$85 plus \$12 for each person attending. Determine the linear equation that models this problem. What is the cost for 89 people?

- a. $y = 12x - 85$; \$983
- b. $y = 85x + 12$; \$7577
- c. $y = 85x - 12$; \$7553
- d. $y = 12x + 85$; \$1153

43. Write the equation in point-slope form of the line that passes through (3, 4) and has a slope of 4.

$$y - 4 = 4(x - 3)$$

44. Write $y = 3x - 6$ in Standard Form.

$$\begin{array}{r} y = 3x - 6 \\ -3x \quad -3x \\ \hline \end{array}$$

$$-3x + y = -6$$

$$3x - y = 6$$

45. Is (3, 1) a solution to the equation $y - x = -4$?

$$1 - 3 \neq -4$$

no

46. Write the equation of the line in Slope-Intercept Form that passes through (1, 4) and has a slope of 2.

$$y = 2x + 2$$

$$\begin{aligned} y &= mx + b \\ 4 &= 2(1) + b \\ -4 &= -2 + b \end{aligned}$$

$$b = 2$$

47. Find the range of the function $y = -3x + 3$ for the following values: $x = \{-2, -1, 0, 1\}$.

$$\{9, 6, 3, 0\}$$

48. Write the inequality for the sentence "The sum of 4 and three times x is greater than 35."

$$4 + 3x > 35$$

49. Use the distributive property to rewrite $5(x-4)$ without parentheses.

$$5x - 20$$

50. Find the range of the function $y = -3x + 8$ for these x values: $\{-2, -1, 0, 1\}$.

$$\{14, 11, 8, 5\}$$

51. Write the mathematical representation of this sentence: "The sum of 10 and twice x is less than 25."

$$10 + 2x < 25$$

52. The number of days in a month are best represented as elements of which real number set?

A. Whole

B. Natural

C. Integers

D. Irrational

$$\{0, 1, 2, 3, \dots\}$$

$$\{1, 2, 3, \dots\}$$

$$\{-2, -1, 0, 1, 2, \dots\}$$

$$\{\pi, \dots\}$$